Bovine Neonatal Pancytopenia: descriptive epidemiology in Belgium

B. Pardon[1], L. Steukers[2], J. Dierick[5], R. Ducatelle[3], V. Saey[3], S. Maes[3], G. Vercauteren[3], K. De Clercq[6], J. Callens[4], K. De Bleecker[4], P. Deprez[1]

[1]Department of Large Animal Internal Medicine,
[2]Department of Virology, Parasitology and Immunology,
[3]Department of Pathology, Bacteriology and Avian Diseases, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium
[4]Animal Health Service-Flanders (DGZ-Vlaanderen), Industrielaan 29, 8820 Torhout, Belgium
[5]AZ Maria Middelares, Kortrijksesteenweg 1026, 9000 Ghent, Belgium
[6]Veterinary and Agrochemical Research Centre, Department of Virology, Groeselenberg 99, B-1180 Brussels, Belgium
Bart.Pardon@UGent.be

Introduction

Bovine neonatal pancytopenia (BNP) is the consensus name for a bleeding and pancytopenic syndrome in neonatal calves which emerged in 2008 all over Europe. The objective was to describe the epidemiology of BNP in Belgium between 2008 and 2010.

Materials and methods

In July 2008 the first BNP affected herds were detected in Flanders (northern Belgium). In 2009 both farmers and veterinarians were informed on the existence of BNP and official reporting of BNP cases was organised at the Flemish Animal Health Service. Herds were only confirmed as a BNP herd when the criteria (Table 1) were met in at least one live or one dead calf. In live calves the presence of leukopenia and thrombocytopenia was used instead of bone marrow cytology for practical reasons. On the first 30 confirmed herds an extensive herd history on colostrum management, feeding regime, breeding program, animal diseases, medication and vaccine use was collected by telephone enquiry and/or farm visit.

Table 1: Case definition of bovine neonatal pancytopenia in live and dead calves

Citerium	Live calf	Dead calf
Age	< 1 month old	< 1 month old
Symptoms	Cutaneous bleeding and/or petechia and/or melena	Cutaneous bleeding and/or petechia and/or melena
Leukopenia	< 3.0 x 10^9 WBC/L	NA
Thrombocytopenia	< 100 x 10^9 PLT/L*	NA
Bone marrow	Cytology**: Bone marrow aplasia Absence of megakaryocytes	Histology: Bone marrow aplasia Absence of megakaryocytes
Bovine viral diarrhea	Antigen PCR negative on blood	Antigen PCR negative on spleen tissue

*Only reliable if processed within 2 hours
**Not systematically performed for practical reasons
NA= not available

Results

Incidence, geographical and seasonal spread (100 herds)

Between June 2008 and October 2010, 100 out of 105 reported herds met the criteria (0.42% of all Flemish herds). A total of 174 affected calves were confirmed. Three herds had already cases in 2007, and two other herds had already observed a similar case in 2006. The number of newly affected herds systematically rose from 14 in 2008, over 26 in 2009 to 60 in 2010. The availability of the national reporting system rather than a sudden spread of the disease is taught to responsible for this rise. The incidence of affected herds was higher in Western (0.63%) and Eastern Flanders (0.50%) than in Antwerp (0.17%), Limburg (0.30%) or Flemish Brabant (0.12%) (Figure 1). The presence of the Faculty of Veterinary Medicine and the Animal Health Service in respectively Eastern and Western Flanders might explain this difference. Whereas a seasonal distribution (higher incidence in summer and fall) was noted in 2008 and 2009, this was less obvious in 2010 as herds and calves were reported almost the year round (Figure 2).

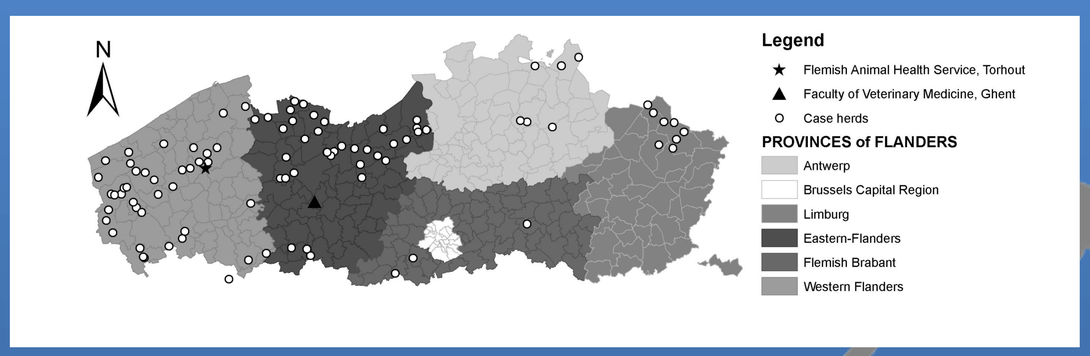

Figure 1: Geographical spread of BNP affected herds in Flanders (S. Ribbens)

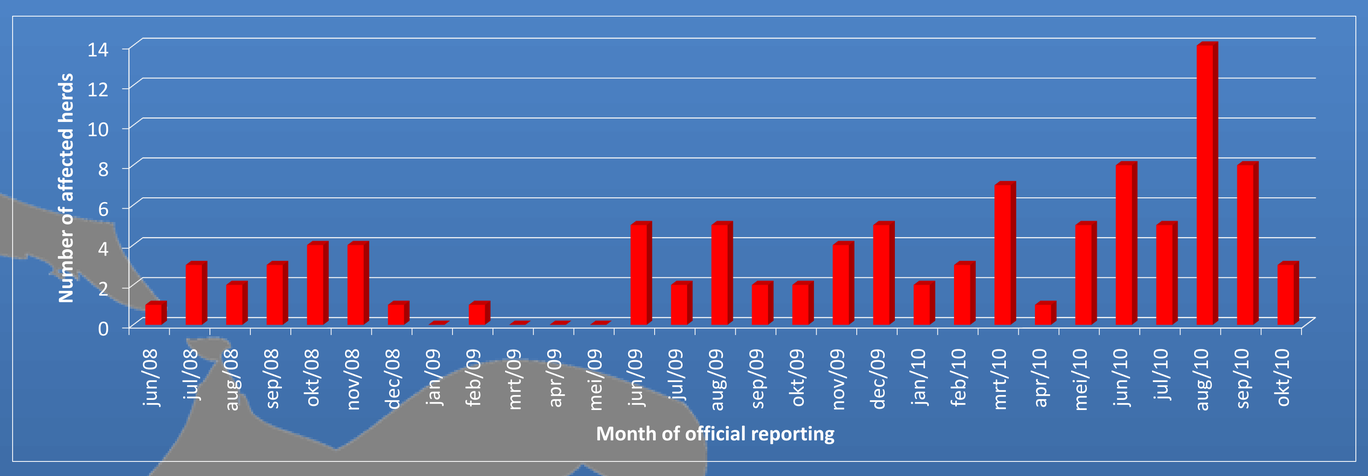

Figure 2: Distribution of newly confirmed BNP herds according to month

Herd history (30 herds)

In 63% of the herds more than one calf was affected in one year, and these cases were almost always clustered (1-6 calves). In 6 out of 7 herds, from which blood samples of calves of the same age group as the clinical case were collected, leukopenia could be demonstrated in one asymptomatic calf, which remained healthy afterwards. Of the affected calves 40% was born from heifers, 30% from 2nd parity, 25% from 3th parity and 5% from 4th parity. In two herds the same cow gave birth to a case twice, not necessarily in consecutive years. On 47% of the farms only fresh colostrum from the mother was given, whereas on 30% fresh colostrum in combination with frozen colostrum from the own herd was used. Only three herds (10%) occasionally used frozen colostrum from another herd. In one herd fresh colostrum was supplemented with a colostrum replacer. Of the herds, 83% reported a history of bovine viral diarrhea (BVD) 1 to 10 years ago. Recent screening results demonstrated BVD circulation in 12 of the 20 examined herds. All but one herd were vaccinated against BVD virus. The one herd, which didn't vaccinate, was the farm that used colostrum replacers. Four BVD vaccines were used of which one had been used or was still used on all but one farm. On three farms the first cases of BNP were observed before BTV vaccination was performed on these farms.

Table 2: General information on the first 30 BNP affected herds in Flanders

Farm ID	Date of admission	Province	Production type	Breed	Total number of cattle present	Number of cattle < 2 years	Cases 2006	Cases 2007	Cases 2008	Cases 2009	Cases Total
Farm 1	02/07/08	WF	Dairy	HF	86	28		2	2		4
Farm 2	30/06/08	EF	Beef	BB	110	64			1		1
Farm 3	09/07/08	EF	Beef	BB	86	40			4		4
Farm 4	10/07/08	WF	Mixed	BB	250	90			1		1
Farm 5	15/08/08	EF	Beef	BB	77	38			1		1
Farm 6	22/08/08	WF	Dairy	HF	90	38			3		3
Farm 7	05/09/08	WF	Dairy	HF	141	66	1	2	3	3	9
Farm 8	08/09/08	WF	Beef	BB	179	102			2	2	4
Farm 9	23/09/08	EF	Dairy	HF	207	116			2	1	3
Farm 10	02/10/09	WF	Dairy	HF	138	58			2		2
Farm 11	06/10/08	EF	Dairy	HF	139	57	1		3		4
Farm 12	23/10/08	A	Beef	BB	121	70		1			1
Farm 13	06/11/08	EF	Dairy	HF	192	92			3	1	4
Farm 14	30/10/08	WF	Dairy	HF	97	48			1		1
Farm 15	03/11/08	EF	Beef	BB	119	67			1		1
Farm 16	18/11/08	L	Dairy	HF	186	67			1		1
Farm 17	18/11/08	WF	Dairy	HF	261	149			1		1
Farm 18	12/12/08	EF	Beef	BB	19	9			3		3
Farm 19	04/02/09	WF	Dairy	HF	273	145			4		4
Farm 20	18/06/09	EF	Beef	BB	200	105				6	6
Farm 21	24/06/09	EF	Beef	BB	90	41				2	2
Farm 22	25/06/09	EF	Dairy	HF	184	76				4	4
Farm 23	26/06/09	WF	Beef	BB	58	32				1	1
Farm 24	12/07/09	WF	Beef	BB	207	122				4	4
Farm 25	22/08/09	EF	Beef	BB	237	132			1	2	3
Farm 26	14/08/09	WF	Mixed	HF/BB	177	91				4	4
Farm 27	24/08/09	WF	Dairy	HF	80	35				1	1
Farm 28	20/08/09	A	Dairy	HF	265	118				3	3
Farm 29	31/08/09	WF	Mixed	HF/BB	150	80				2	2
Farm 30	08/09/09	EF	Mixed	HF	106	50				2	2
Total							2	5	39	38	84

HF= Holstein-Friesian; BB= Belgian Blue; WF= Western Flanders; EF= Eastern Flanders; A= Antwerp; L= Limburg